(e) outputting the samples of said sequence to generate a waveform.

Claim 14, line 8 of claim, change "a previous output" to --an immediately preceding--.

## REMARKS

Reconsideration of this application is respectfully requested. The specification has been amended to provide headings as suggested in the action. In addition, an Abstract is being submitted for this application.

The rejection of claims 1, 3, 4, 5, 8 and 15 as being anticipated by Masaki et al (Masaki -- EP 0 385 444) is traversed.

The claimed method relates to a method of generating waveforms by (a) generating a first synthetic waveform sample, (b) generating each successive waveform sample based on: (i) the preceding sample and (ii) data defining a transformation followed by cycles of similar waveforms in the temporal vicinity of the preceding synthetic waveform sample; (c & d) successively repeating step (b) to generate a series of waveform samples by designating the waveform sample generated in the last iteration of step (b) as the preceding waveform sample, and (e) outputting the series of waveform samples as the generated waveform.

Masaki does not disclose a method of generating a waveform from a sequential series of synthetic waveforms is disclosed in Masaki. Rather, Masaki discloses combining fundamental segments of waveforms together by interpolation to produce a

waveform simulating a classical musical instrument. Masaki, col. 1, first paragraph. The "fundamental segment waveform data" is selected in Masaki based on performance information regarding the play of the musical instrument. Maskai, col. 7, lns. 30-36. In particular, Masaki states as follows:

> "The desirable fundamental waveform data is read out at an address corresponding to a coordinate position determined by selecting desirable musical tone control parameters. Then, an interpolation operation is carried out on the fundamental waveform data which are sequentially read out so that an interpolated musical tone waveform signal is formed. The waveform of the interpolated musical tone waveform signal is similar to and intermediate to the waveforms of the fundamental waveform data to be synthesized." [Masaki, Abstract].

In Masaki, each stored fundamental waveform data comprises 1024 sample volumes of the waveform. Masaki, col. 7, lns. 27-30, and Fig. 3. Masaki does not generate waveforms to reproduce a musical instrument sound, but rather selects existing waveforms and then interpolates between the selected waveforms to create the reproduced sound. In contrast, claim 1 of the present invention relates to a method that "generates" each sample value based on: (i) the immediately-previous sample value; and (ii) data representing the evolution of the waveform in the temporal vicinity of the previous sample.

Moreover, Masaki forms synthesized waveform data ($S_{uvw}$ ($wt$)) from eight fundamental waveform data segments ($F_{IJK}$ to $F_{(i+1)(j+1)(k+1)}$) for each period of the output acoustic waveform. Each sample of the output synthesized waveform signal described in

Masaki is merely a weighted combination of sample values from the eight fundamental segment waveforms. Masaki, cols. 10 to 19. For example, a tenth sample of the output synthesized waveform is a weighted combination of the tenth sample values of the eight fundamental segment waveforms. It follows that each sample of the synthesized waveform does not depend on the immediately-previous sample value. Hence, step (b) of claim 1 is not disclosed in Masaki. Because Masaki does not disclose the same invention as recited in claim 1 (it specifically does not teach or suggest steps (b & c) of claim 1), the rejection of claim 1 for anticipation is unfounded and should be withdrawn. The other claims rejected as being anticipated by Masaki depend on claim 1 and should be allowed over Masaki for the reasons stated for claim 1.

The rejection of claim 12 as being anticipated by Kohut et al (USP 4,022,974) is moot in view of the cancellation of that claim. Similarly, the rejection of claim 13 as being anticipated by Hirokawa et al (article "High Quality Speech Synthesis System Based on Waveform Concatenation of Phoneme Segment") is moot in view of the cancellation of that claim.

However, the rejection of claim 14 as being anticipated by Hirokawa is traversed and has been overcome by amendment. Claim 14 has been amended to make more clear that the synthesis process involves predicting a sample speech value based on both the immediately-preceding sample value and a transformation of how the interpolated waveform evolves over a cycle. In contrast, Hirokawa's speech synthesizer concatenates segments of recorded sounds and does not generate sounds in the manner recited in claim

1. In particular, Hirokawa's synthesizer does not generate a model of the evolution of the sound over a short time interval or of a waveform. Moreover, Hirokawa does not use a generated waveform segment to calculate successive waveform segments. Accordingly, Hirokawa does not anticipate claim 14 which includes the limitation of "calculating each successive output value from an immediately-preceding value using said evolution model".

The rejection of claim 1, 3 to 11 and 15 as being anticipated by Mindlin et al "Topological Analysis and Synthesis of Chaotic Time Series" is traversed. Mindlin does not disclose the steps (b) to (d) of independent claim 1 which relate to generating a successive sequence of waveform segments based on a preceding segment and a model of a sound. *See* Specification page 11, lines 17 to 20 (regarding the use of the term "embedding" in the context of the present invention). In Mindlin, the step of "embedding" involves representing a waveform in a state sequence space and is part of the analysis of a waveform rather than its synthesis. Mindlin does not disclose step (b) of claim 1 of generating successful waveform samples because the embedding step disclosed in Mindlin relates to analysis of a chaotic time series and does not relate to modeling or reproducing such a series. Moreover, the topological analysis in Mindlin is used to generate a template. The template is used to provide a model for use in generating a chaotic time series of data. Accordingly, Mindlin does not teach the generation of a synthetic waveform sample using steps (b) through (d) of claim 1.

Similarly, the rejection of dependent claims 3 through 11 and 15 as being anticipated by Mindlin should be overcome for the same reasons as stated above for claim 1.

The rejection of claims 2 and 12 as being obvious over Mindlin as applied to claim 1 is traversed for the same reasons as stated for claim 1.

All claims are believed to be in good condition for allowance. If any small matter remains outstanding, the Examiner is requested to telephone applicant's attorney. Prompt reconsideration and allowance of this application is respectfully requested.

Respectfully submitted,

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